

an intermediate frequency of 44 MHz is output from the output terminal of the UHF mixer 36.

The intermediate-frequency signal is applied to the filter 51. The filter 51 is a band-pass filter having sharp characteristics and connected to the intermediate-frequency amplifier 52. The intermediate-frequency signal amplified by the intermediate-frequency amplifier 52 is output from the output terminal 56 of the tuner.

When a VHF high-band TV signal is received, the TV signal received by the antenna 31 is applied to the filter 51 through the VHF high-band mono-tuning circuit 39, VHF high-band high-frequency amplifier 40, VHF high-band multi-tuning circuit 41 and VHF high-band mixer 42. As the operations of the above circuits are the same as the UHF circuits, their descriptions are omitted. As the operation of the VHF high-band local oscillator 43 and the operation of the VHF high-band resonance circuit 44 are also the same as the UHF circuits, their descriptions are omitted.

When a VHF low-band TV signal is received, the TV signal received by the antenna 31 is applied to the filter 51 through the VHF low-band mono-tuning circuit 45, VHF low-band high-frequency amplifier 46, VHF low-band multi-tuning circuit 47 and VHF low-band mixer 48. As the operations of the above circuits are the same as the UHF circuits, their descriptions are omitted. As the

operation of the VHF low-band local oscillator 49 and the operation of the VHF low-band resonance circuit 50 are also the same as the UHF circuits, their descriptions are omitted.

The PLL IC 53 is a circuit for selecting a channel to be received. To receive a UHF band channel, a UHF band switch voltage  $V_u$  for selecting a UHF band channel is applied to the UHF high-frequency amplifier 34 and a tuning voltage  $V_t$  corresponding to the selected channel is applied to the UHF mono-tuning circuit 33, the UHF multi-tuning circuit 35 and the UHF resonance circuit 38. To receive a VHF high-band channel, a VHF high-band switch voltage  $V_{hi}$  for selecting a VHF high-band channel is applied to the VHF high-band high-frequency amplifier 40 and a tuning voltage  $V_t$  corresponding to the selected channel is applied to the VHF high-band mono-tuning circuit 39, the VHF high-band multi-tuning circuit 41 and the VHF high-band resonance circuit 44. To receive a VHF low-band channel, a VHF low-band switch voltage  $V_{hi}$  for selecting a VHF low-band channel is applied to the VHF low-band high-frequency amplifier 46 and a tuning voltage  $V_t$  corresponding to the selected channel is applied to the VHF low-band mono-tuning circuit 45, the VHF low-band multi-tuning circuit 47 and the VHF low-band resonance circuit 50. Further, a control voltage is applied to a local oscillator switch 55 in the PLL IC 53.

## SUMMARY OF THE INVENTION

To improve the accuracy of the frequency of the local oscillation signal output from the local oscillator, the ratio of the highest oscillation frequency to the lowest oscillation frequency of the local oscillation signal must be controlled to 3:1 or less, preferably 2:1 or less. Therefore, the abovementioned tuner requires three local oscillators and resonance circuits for UHF, VHF high-band and VHF low-band channels, whereby the tuner becomes bulky and costs dear. The present invention has been made in view of the above situation and an object of the present invention is to provide a small-sized and inexpensive tuner.

To solve the above problem, according to a first aspect of the present invention, there is provided a TV signal receiving tuner for receiving TV signals by dividing them into a plurality of frequency bands, comprising a local oscillator which oscillates at a frequency range corresponding to a TV signal having a predetermined frequency band, a first programmable divider which receives a local oscillation signal of the local oscillator and divides the local oscillation signal, and a first mixer which mixes the received TV signal and the output of the first programmable divider and frequency converts the received TV signal into an intermediate-frequency signal having a predetermined frequency, wherein the dividing rate of the first programmable